however it is unclear whether such pts require surgical intervention or can continue to be treated by transcatheter techniques. To evaluate the effectiveness of repeat BAV, a retrospective review was performed of all 14 pts with congenital aortic stenosis who underwent a second BAV at our institution between 1987–1995. Medical records and cineangiograms were reviewed to obtain age, pre and post gradients, and outcomes for the initial and repeat BAV. The inital BAV, performed at a median age of 6.0 yrs (range: 1 mo–18.1 yrs), achieved an immediate reduction in gradient from 83 ± 6 to 41 ± 4 mmHg (mean ± SE; $p < 0.001$). Trace aortic regurgitation (AR) was produced in 6 pts and 2+ AR developed in 1 pt. A second BAV procedure was performed for recurrent aortic stenosis at a median interval from initial BAV of 6.0 yrs (2 mo–9.8 yrs). The median age at the second BAV was 11.7 yrs (2.0–21.3 yrs). The recurrent gradient was reduced acutely from 73 ± 6 to 38 ± 5 mmHg ($p < 0.001$). Trace AR was produced in 4 pts and trace AR increased to 2+ in 3 pts. Three patients had unsatisfactory gradient relief (> 50 mmHg) and required surgical intervention (Ross procedure n = 2; valve replacement n = 1). One late death occurred in a child with restrictive cardiomyopathy following triple valve replacement. The remaining 10 pts have not required further intervention for aortic stenosis or regurgitation during a median follow-up period of 23 mos (3–96 mos) after repeat BAV.

Conclusion: Repeat BAV for recurrent aortic stenosis provides effective gradient relief without a high prevalence of significant AR. It offers worthwhile palliation for most patients with restenosis following previous BAV for congenital aortic stenosis.

926-14 Laser Valvotomy With Balloon Valvuloplasty for Pulmonary Atresia With Intact Ventricular Septum

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Laser valvotomy followed by balloon dilatation has been used to treat patients with pulmonary atresia and intact ventricular septum in our centre since 1991. Selection criteria included a tripartite right ventricle with no more than minor hypoplasia of the tricuspid valve. 9 infants aged 1–70 (median 4.5) days with weight of 2.1–4.7 (median 3.5) kg have been treated. A 4 or 5F Cobra catheter was manipulated below the imperforate pulmonary valve with the aid of hand injections of contrast and a frozen lateral left ventricular angiogram showing the pulmonary trunk opacified via the duct. Perforation of the valve was achieved using a Trimedyne 0.018" laser guide wire with 1–3 continuous wave laser firings of 3–5 watts of 3–5 s duration. The laser guide wire or an 0.018" Flex T wire was passed into the pulmonary trunk and into the right pulmonary artery or the descending aorta via the duct. Dilatation of the valve was performed first with a 3–3.5F coronary angioplasty balloon of 2–4 mm diameter and then by a 5–8 mm balloon. Valvotomy and balloon dilatation was successful in 8 patients, the failure being due to laser breakdown. The only complication was transient SVT. Prostaglandin E was discontinued immediately but was recommenced in 2 patients for 30 and 49 days. Right ventricular outflow velocities following ductal closure were 1.6–3.8 m/s (mean 2.6) and oxygen saturation were 60–97% (mean 76). Repeat balloon dilatation was required in 2 patients after 22 and 116 days. At follow up after 90–1720 (median 98) days, right ventricular outflow velocities were 1.6–4.5 m/s and oxygen saturations 70–97%. The oldest patient, now 4 years old had surgical relief of infundibular stenosis and closure of ASD. Another patient requires similar surgery. Laser valvotomy and balloon dilatation offers a safe and effective alternative to surgical pulmonary valvotomy in this group of patients.

927 Ventricular Repolarization: Clinical Findings

Monday, March 25, 1996, 3:00 p.m.–5:00 p.m.
Orange County Convention Center, Hall E
Presentation Hour: 4:00 p.m.–5:00 p.m.

927-15 Effects of Gender on the Dynamic Relation Between Ventricular Repolarization and Heart Rate

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Women have a longer QTc than men on surface electrocardiogram. To verify whether gender related differences exist in the dynamic relation between ventricular repolarization and cycle length, we analized 24-hour Holter recordings of 20 female (F) and 20 male (M) healthy young subjects. In 14 of them recordings were repeated after beta-blockade (BB, 3-day nadolol 80 mg daily). The early portion (QTp) and the entire QT interval (QTe) were automatically measured by a dedicated algorhythm (Ela Medical) and the linear regression slopes (QTp/RR and QTe/RR) were calculated. In control conditions F had a shorter RR interval than M (803 ± 129 vs 877 ± 86 ms, $p \approx 0.037$). QTp and QTe at constant cycle length (1000 ms) were longer in F than M (330 ± 20 vs 309 ± 18 ms, $p = 0.002$ and 410 ± 17 vs 389 ± 19 ms, $p = 0.002$, respectively). Both QTp/RR and QTe/RR slopes were steeper in F than in M (0.20 ± 0.04 vs 0.16 ± 0.03, $p \approx 0.001$ and 0.16 ± 0.04 vs 0.13 ± 0.03, $p \approx 0.027$, respectively). BB reduced QTp/RR slope by 21% ($p = 0.002$) in both genders and did not modify QTe/RR slope. Thus, the dynamic relation between ventricular repolarization and heart rate is affected by gender. The differences in QTa and QTe duration between males and females are more marked at long cycle lengths and seem to be independent of the level of sympathetic activity.

927-16 Are Repolarization Duration and Dispersion Related to the Heart Rate Variability Parameters in Ischemic Heart Disease Patients?

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Prolonged duration or increased dispersion of repolarization (Rep) and decreased heart rate variability (HRV) indicate an elevated risk of cardiac death in postinfarction patients. There are no clinical data as to whether these ECG parameters provide independent clinical information. The aim of our study was to examine association between Rep and HRV parameters in 57 stable ischemic heart disease pts (mean age: 61 ± 12 years). A standard 12-lead ECG served to analyze repolarization duration (QTc) and dispersion (JTd; max-min JT in 12 leads), and 24-hour Holter ECG recording was used to evaluate time-domain HRV parameters: 1) SDNN — standard deviation of all normal RR intervals; rMSSD — root mean square successive difference; SDANN — standard deviation of the mean of all 5-min segments of normal RR intervals; SDNNIX — mean of standard deviations of all normal RR intervals for all 5-min segments. Mean ± sd (ms) values for all parameters (in parentheses) with correlation coefficients for relationship between repolarization and HRV variables are presented below (all p values for correlation coefficients > 0.10):

HRV: / Rep:	SDNN (127 ± 33)	rMSSD (42 ± 27)	SDANN (111 ± 34)	SDNNIX (66 ± 31)
QTc (408 ± 31)	−0.18	−0.19	−0.08	0.01
JTd (62 ± 22)	−0.05	0.09	0.08	0.04

Conclusions: Repolarization duration and dispersion do not show any relationship with HRV parameters in stable ischemic heart disease patients. The simultaneous evaluation of repolarization and HRV parameters therefore provides complementary information about myocardial substrate and autonomic activity in patients with ischemic heart disease.

927-17 Influences of Autonomic Tone on QT Interval Rate-Dependence Can Be Assessed by 24-Hour ECG Recording

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A selective approach of ventricular repolarization (VR) has been studied by atrial pacing with pharmacological interventions during daytime. This study is based on spontaneous data obtained from 24-Hour ECG to dissociate the influences of heart rate (HR), autonomic tone and myocardial disease on spontaneous VR variations in 15 normal controls (C) and in 12 pts with chronic heart failure (CHF). Age and sex ratio were not different between the groups. The QRS complexes were classified according to the mean RR interval over the preceding minute which had to be stable (a variation of 15 ms was allowed). An average QRS template was created from those individual complexes to improve the signal-to-noise ratio. From each recording, day and night periods were processed separately. The QT apex intervals (QTa) and the slopes of the curves relating QTa and stable RR intervals were measured for each template. A diurnal and a nocturnal QTa were calculated for a stable RR interval equal to the mean RR interval over 24 hours to obtain a diurnal and a nocturnal QTa at similar constant HR. The difference between nocturnal and diurnal QTa was also calculated. Strong positive linear relationships between QTa and RR intervals were present in each pt at daytime and at night ($r > 0.91$). For the same stable RR interval, the QTa interval was shorter during the day than at night in both groups. The physiological circadian QTa variation (20 ± 6 ms) was reduced in CHF (8 ± 10 ms, $p = 0.002$) mainly due to steeper QTa/RR night slopes in CHF (0.15 ± 0.05) than in C (0.11 ± 0.04, $p < 0.05$). Thus, pts with CHF demonstrate an impairment in the circadian variation of VR duration independant of HR. The influences of HR, autonomic tone and myocardial disease on spontaneous QT interval